

# USE G. E. MAZDA PHOTO LAMPS FOR CONTROLLED LIGHTING

**G**ENERAL Electric MAZDA Photo lamps offer you complete lighting control whether in or out of studio. Portrait, banquet, commercial or news photography—there is a proper and efficient MAZDA lamp to do the lighting job.

These lamps have been designed with the problems of the photographer well in mind. For lighting in the studio, there are economical high-wattage lamps. For work where speed, portability, and power are of prime importance, Photoflash lamps are ideal. Photoflood lamps, with their greater volume of light for low current consumption make home portraiture easier by avoiding fuse troubles.

So it goes. Whatever your lighting problem, there is some type of MAZDA lamp which will perform efficiently to help you achieve the desired results. And G. E. MAZDA Photo lamps give you full advantage of the color sensitivity of the new fast films.

In the following pages we give detailed information on the characteristics of these lamps, as well as some examples of their use.

For modern lighting effects in your photographs, and for efficient economical service, use G. E. MAZDA Photo lamps.





# G. E. MAZDA PHOTOFLASH LAMPS



No. 10

No. 20

No. 75

**W**HERE speed, power, and portability are of prime importance, G. E. MAZDA Photoflash lamps are ideal. Their silent flash is fast enough to stop normal actions and insure natural expressions.

To cover the wide range of needs for flashlight photography, G. E. MAZDA Photoflash lamps have been developed in three sizes. All three sizes operate on voltages ranging from 3 to 125, direct or alternating current.

## **Photoflash No. 10**

The G. E. MAZDA Photoflash lamp No. 10 is smaller than the familiar No. 20 lamp and produces about one-half as much light. This is ample for close-ups of action and should prove especially useful in taking portraits of children at play.

## **Photoflash No. 20**

The original G. E. MAZDA Photoflash lamp (comparable in bulb size to a 100-watt lamp)—designated as No. 20—provides a handy, portable light source for all general photographic work.

## **Photoflash No. 75**

The G. E. MAZDA Photoflash lamp No. 75 emits about four times more light than the No. 20. It is recommended for color photography, and particularly for newspaper and commercial photography where a large area must be illuminated from a single flash.

## **Quality of the Light**

MAZDA Photoflash lamps emit light of all colors. There is an adequate quantity of violet, blue, and green light so that ordinary and orthochromatic emulsions will be amply exposed. Yellow, orange, and red light, increasing in amount from the yellow to the red, are present; hence, panchromatic emulsions with their improved rendering of all colors are recommended.



# Speed · Power · Portability

## Use of Reflectors

A good reflector should always be used with MAZDA Photoflash lamps. Not only does it increase by many times the efficiency of the light source by utilizing light that would otherwise be wasted, but it produces softer and more natural shadows than when a bare lamp is used.

## Average Distance Covered

The following figures are based on use of one G. E. MAZDA Photoflash lamp in a good reflector, and in rooms with medium colored walls and ceiling. Where pictures are made outdoors or under adverse conditions at the greater distances, use next larger diaphragm opening or reduce distance from lamp to subject to about 70% of that shown.

Diaphragm Opening	Lamp Size	Approximate Distance Lamp to Subject	
		"Chrome Type" Film	Supersensitive Panchromatic
F 22	No. 10	5 Feet	7 Feet
	No. 20	7 Feet	10 Feet
F 16	No. 10	7 Feet	10 Feet
	No. 20	10 Feet	15 Feet
F 11	No. 10	10 Feet	15 Feet
	No. 20	15 Feet	20 Feet
F 8	No. 10	15 Feet	20 Feet
	No. 20	20 Feet	30 Feet
F 6.3	No. 10	20 Feet	25 Feet
	No. 20	25 Feet	35 Feet

## Number of Lamps Required

In figuring the number of lamps to be used for a given large area it is well to remember that one Photoflash lamp No. 20 in a reflector should be used for every 200 square feet of floor area. This assumes that the lens is operating at F/16, medium-colored walls and ceiling, and normal panchromatic film. With faster pan films, the number of lamps may be reduced by one-half. For smaller areas, under similar conditions of lens stop and film, a greater number of lamps than called for by the above rule may have to be used depending on lighting arrangements and subjects.

If No. 10 or No. 75 lamps are used the number required may be determined according to the comparison given on the opposite page.

In photographing large assemblies with the camera in an elevated position, the lens can be tilted so as to focus sharply both the front and rear parts of the group. This permits lens apertures as great as F/8 and hence 800 square feet of floor space per No. 20 lamp.

Because of its power and excellent timing characteristics the No. 20 lamp is recommended for newspaper photography. However, newspaper photographers frequently operate under such conditions that a lens aperture of the order of F/4.5 is practical, and with the fast emulsions employed for their work, one No. 10 lamp supplies ample light for many of their pictures while the No. 20 and No. 75 lamps assure sufficient light for greater areas.

For high-speed work, the No. 20 lamp may be synchronized with high-speed shutters by using a synchronizer with a positive time adjustment. (See pages fourteen and fifteen for additional data.)





Taken with 10 G. E. MAZDA Photoflash lamps No. 20 in reflectors. Normal panchromatic film. Lens at F/16.

Taken with 5 G. E. MAZDA Photoflash lamps No. 20 in reflectors. Normal panchromatic film. Lens at F/16.







Pictures like this can be taken with 3 or 4 Photoflash lamps No. 20 in individual reflectors, or 1 Photoflash lamp No. 75 in a reflector. Lens opening F/11.

Taken with 2 G. E. MAZDA Photoflash Lamps No. 75.  
Aperture between F/11 and F/16. Fast pan film.

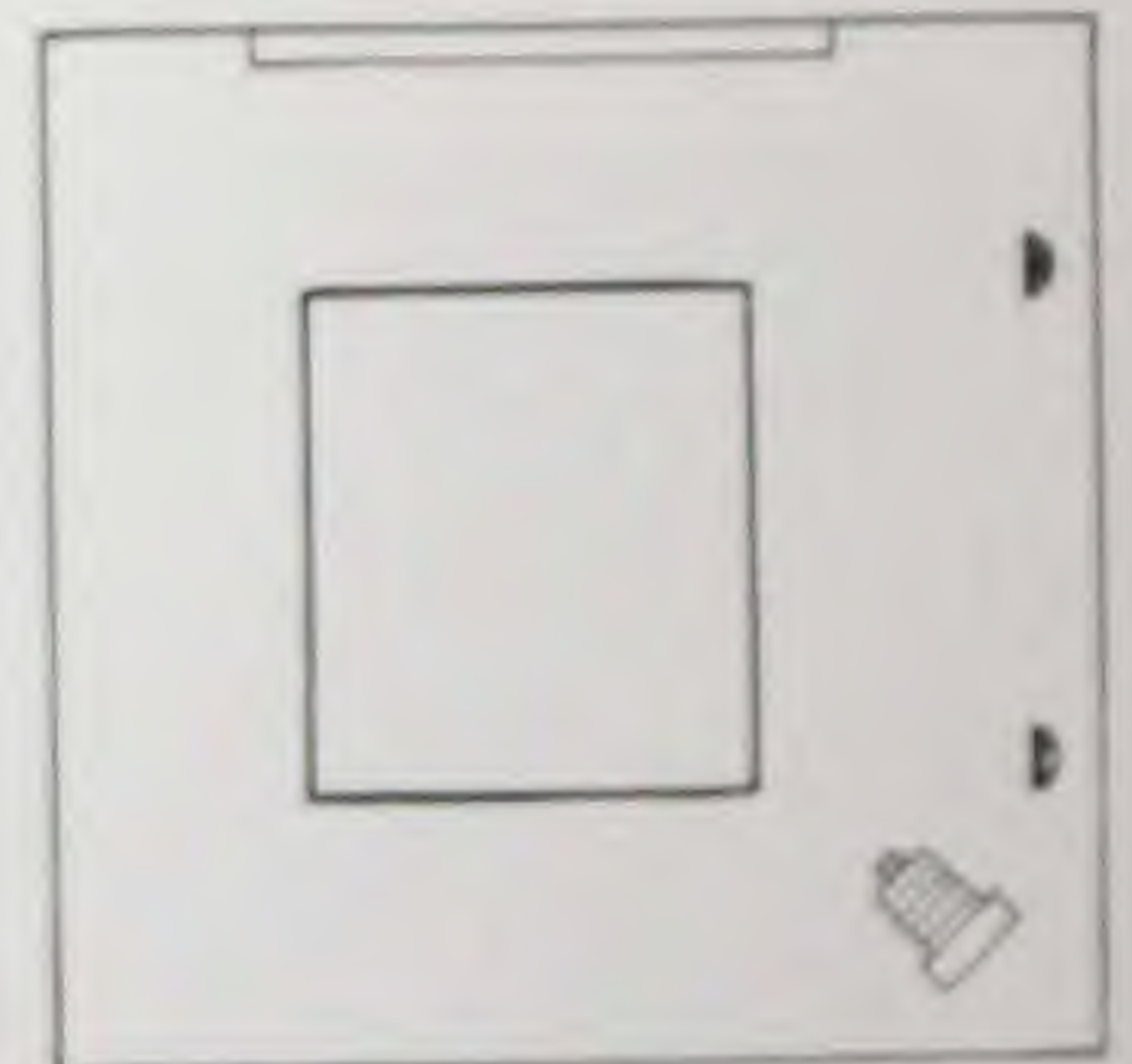






Taken with 3 G. E. MAZDA Photoflash lamps  
No. 20 in reflectors. Fast panchromatic film.  
Lens at F/16.

Taken with 2 G. E. MAZDA Photoflash lamps  
No. 20 in reflectors. Normal orthochromatic  
film. Lens at F/16.





# G. E. MAZDA PHOTOFLOOD LAMPS



No. 1

No. 4

*Low Current Consumption*  
*Excellent Color Rendition*  
*Portability of Equipment*

**T**HE high efficiency of G. E. MAZDA Photoflood lamps brings you high light output without the usual difficulties of high current consumption and bulky equipments. By using the two sizes of Photoflood lamps in various quantities and arrangements, the photographer can meet most lighting requirements and secure unusual lighting effects.

## **Photoflood No. 1**

G. E. MAZDA Photoflood lamps are available in two sizes. Both operate on 105 to 120 volts, alternating or direct current. Both are inside frosted. The original Photoflood lamp (now designated as MAZDA Photoflood Lamp No. 1), which is the same size as a standard 60-watt lamp, draws approximately 250 watts at 115 volts (2.13 amperes), yet this lamp is photographically as effective as about 750 watts in standard lighting lamps. As many as five MAZDA Photoflood lamps No. 1 can be used on one regular house lighting circuit without danger of blowing the usual 15-ampere fuse. Because of the high efficiency of this lamp, its burning life is about 120 minutes at 115 volts.

## **Photoflood No. 4**

The G. E. MAZDA Photoflood lamp No. 4 is the same size and shape as the regular 300-watt general service MAZDA lamp with a mogul screw base. It has a rated life of ten hours at 115 volts.

The current drawn by Photoflood lamp No. 4 is approximately 8.7 amperes at 115 volts. Therefore, it is recommended that circuits on which this lamp is used be fused for 10 amperes for each lamp employed.

The new Photoflood lamp No. 4 uses the same amount of electricity as the regular pear-shaped 1000-watt MAZDA lamp which has been used extensively for many years in photographic work, but produces 1-2/3 times as much visible illumination. This, combined with the improved color quality in the light produced by the Photoflood No. 4 through increased operating efficiency, makes it easily 2-1/2 times as effective photographically as the regular 1000-watt MAZDA lamp.



## Color Quality

The quality of the light emitted from either G. E. MAZDA Photoflood lamp contains all the colors of the spectrum and harmonizes perfectly with the sensitivity of the new "pan" films. The photographer can take full advantage of the greater speed of this film and at the same time secure proper color values without the use of filters. The G. E. MAZDA Photoflood lamp is also well suited for making pictures in color. Some color plates require filters and others do not; before attempting color photography the photographer should consult the manufacturers of the color material, who already possess filter data for these lamps.

## Reflectors

For best results, the MAZDA Photoflood lamp should be used with a reflector which will collect its light and redirect it into areas where it will be most useful. A correctly designed reflector will increase the effectiveness of the lamp several fold. In general, one lamp in a reflector equals three or four bare lamps. In addition to greatly increasing the illumination in useful areas, reflectors possess the further advantage of increasing the size of the light source, thereby softening the shadows and improving the quality of the photograph.

## Unusual Lighting Effects

G. E. MAZDA Photoflood lamps provide highly flexible lighting for commercial, studio or home portrait work. Equipment is light and compact. By arrangement of portable reflecting equipment many unusual lighting effects can be obtained. Although one or two lamps provide sufficient illumination for a fairly short exposure, additional light sources are often desirable to soften shadows and avoid flatness. G. E. MAZDA Photoflood lamp No. 1 used in a small-lens spotlight produces excellent lighting effects.

It is interesting to note that one Photoflood lamp No. 4 and two Photoflood lamps No. 1 may be used on a home lighting circuit fused for 15 amperes, which is customary. This makes an ideal setup for home portrait work, including child portraiture where fast exposures are needed.

## Lighting Cost

The question has often been asked why a two hour life was chosen for the G. E. MAZDA Photoflood No. 1 and ten hours life for Photoflood No. 4. Shortening the life of any lamp rapidly increases the volume of light emitted as well as its photographic effectiveness or actinic. As a result of thorough analysis of all the factors, it has been found that two hours and ten hours for G. E. MAZDA Photofloods Nos. 1 and 4, respectively, represent the best balance between a maximum volume of photographic light and lamp renewal cost. Figure 3, page fifteen, shows this relationship very clearly. (See pages fourteen and fifteen for additional data on G. E. MAZDA Photoflood lamps.)





# Table for Exposures— PHOTOFLOOD No. 1\*

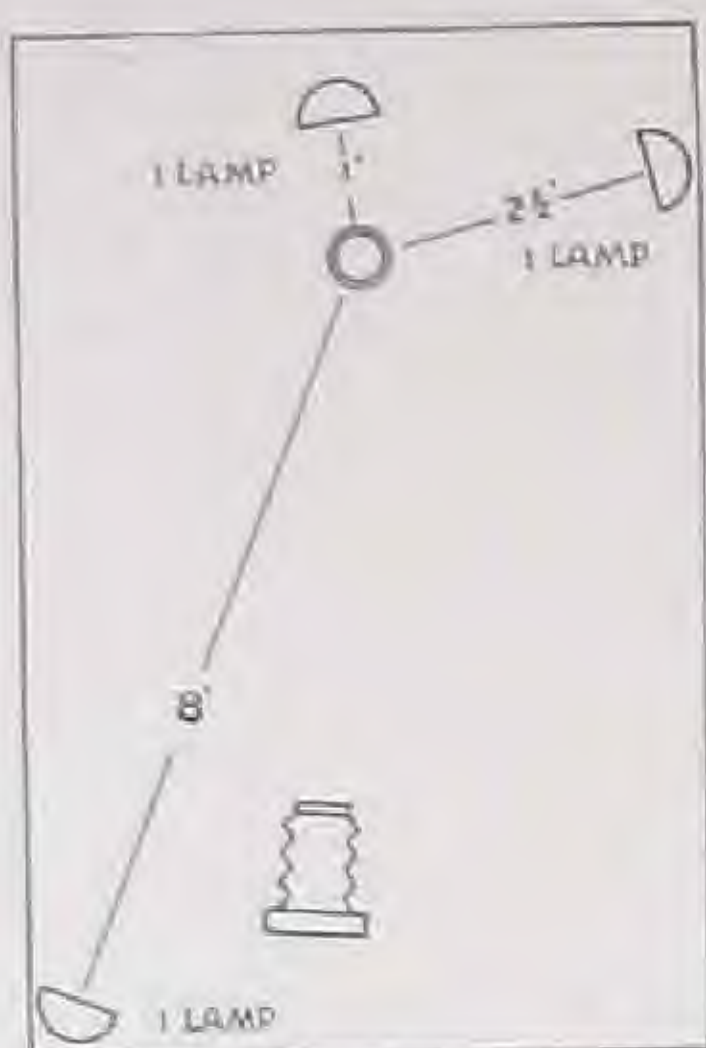
**Portrait, Super-sensitive or Fast Panchromatic Film**

Distance— Lamps to Subject	Diaphragm Opening	Number of Lamps in Reflectors	Time in Seconds
4 feet	F 4.5	1	1/10
4 feet	F 6.3	1	1/5
4 feet	F 8	1	1/2
4 feet	F 11	1	1
4 feet	F 16	2	1
6 feet	F 4.5	1	1/5
6 feet	F 6.3	1	1/2
6 feet	F 8	1	1
6 feet	F 11	2	1
6 feet	F 16	3	1 1/2
10 feet	F 4.5	1	1/2
10 feet	F 6.3	2	1
10 feet	F 8	3	1
10 feet	F 11	4	1 1/2
10 feet	F 16	5	2 1/2

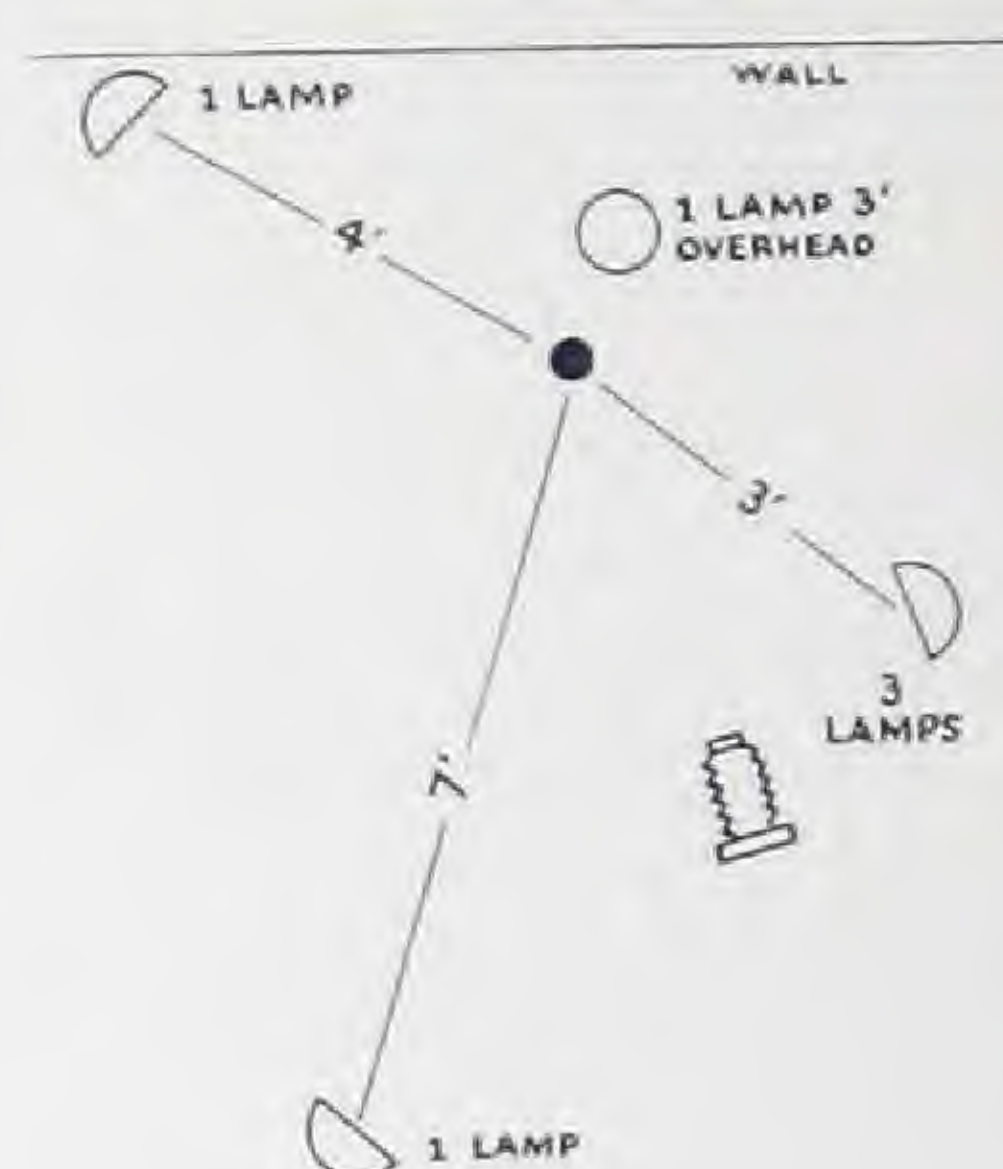
Exposure time given above can be shortened by increasing the number of lamps. For instance, if two lamps require two seconds, four lamps will give sufficient exposure in one second.

\*Photoflood lamp No. 4 gives about four times as much photographically effective light as Photoflood lamp No. 1. Figure exposures with this lamp accordingly.

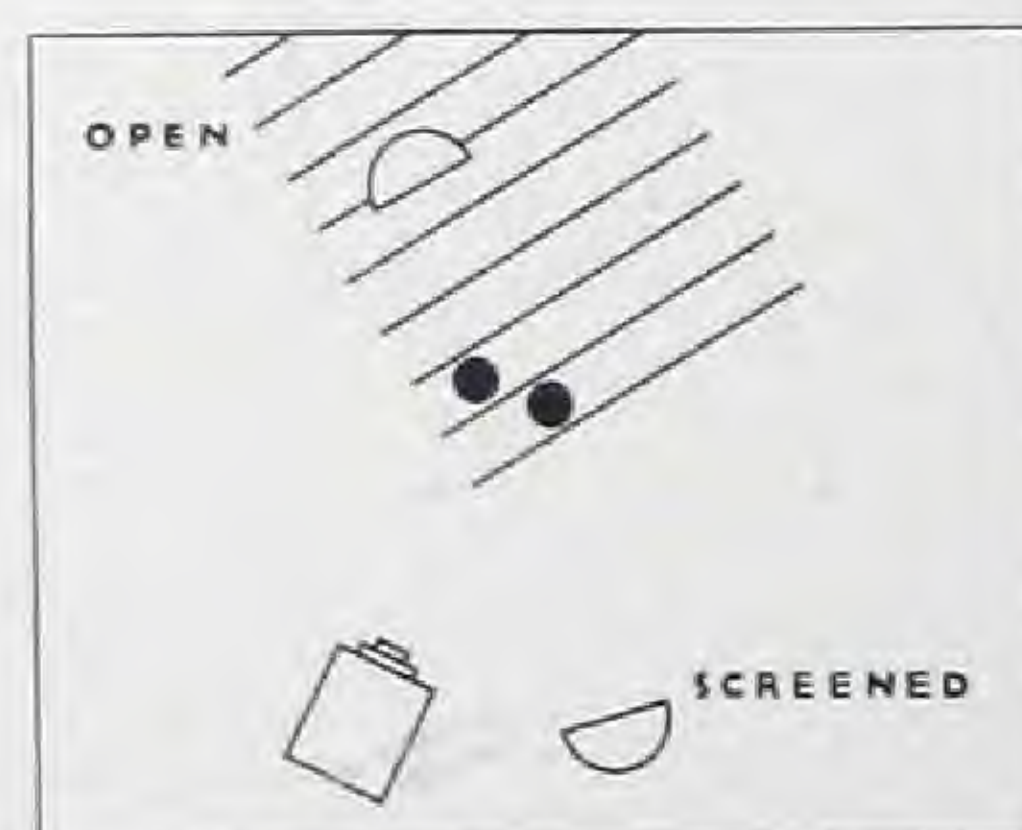




Taken with G. E. MAZDA Photoflood lamps No. 1 through diffusing screen. Red dress, black background. Exposure: 1/5 of a second at F/6.3 on fast pan film.



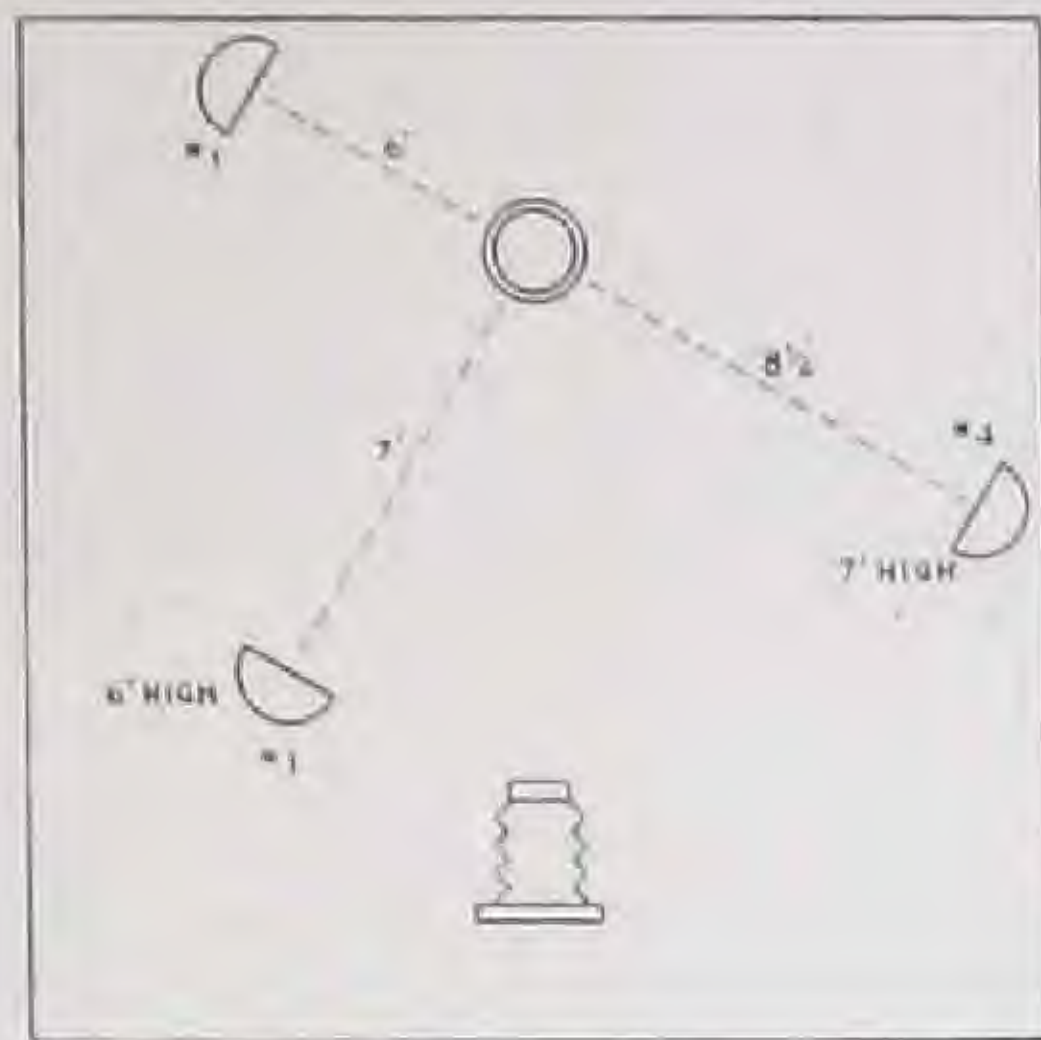
Taken with G. E. MAZDA Photoflood lamps No. 1. The lamp directly behind the subject was placed just below his shoulders; it may be eliminated if desired. A cardboard screen kept the light of the other back-light from striking the background, and the lens was shielded. Diffusing screen used in front of the lamp nearest the camera. Exposure 1 second at F/4.5 on fast pan film.



Taken with 2 G. E. MAZDA Photoflood lamps No. 1. Home portrait sittings are made on dark days as well as on bright days. In following this lighting scheme, notice that the "sunlight effect" lamp should be open and as close to the subjects as possible without appearing in the picture.



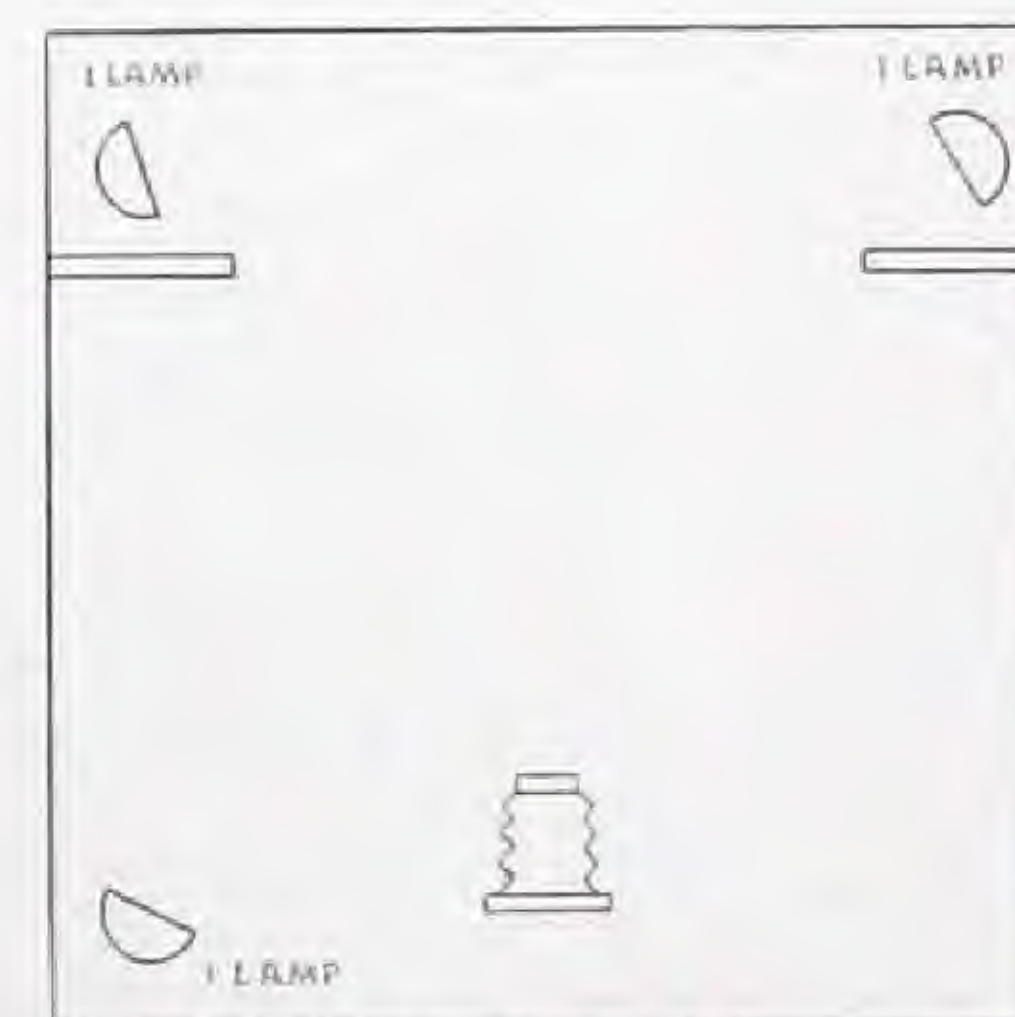




Taken with one G. E. MAZDA Photoflood lamp No. 4 and 2 Photoflood lamps No. 1. Exposure: 1/5 second on portrait pan film. Note the value of this lighting for home portrait, since this setup can be used on the usual 15-ampere fuse.



Taken with 3 G. E. MAZDA Photoflood lamps No. 1 and general room lighting. Portrait pan film. 10 seconds exposure at F/32.





# THE G. E. MAZDA MOVIEFLOOD LAMP

## *For Movie or Still Photography*

**T**HE G. E. MAZDA Movieflood lamp is an excellent light source for black-and-white or color motion picture photography and for general photographic lighting. It has a visible light output approximately equal to that of three standard 1000-watt pear-shaped lamps. Photographically it is approximately equal to five standard 1000-watt lamps.

This lamp may be operated on voltages from 105 to 120, alternating or direct current. It is constructed in the PS-52 clear bulb, which is 6-1/2 inches in diameter and 13-1/8 inches in over-all length and is fitted with the mogul screw base. The Movieflood lamp consumes 2000 watts and has a life of approximately 15 hours (at 115 volts).

### **Equipment**

The Movieflood lamp will fit in any reflecting equipment designed for the regular 1000-watt or 1500-watt pear-shaped lamp, although its use is not recommended in equipments of a totally enclosing type which might result in overheating of the lamp.

The G. E. MAZDA Movieflood lamp produces less heat than an equal wattage of standard lamps. This means greater comfort for everyone on the set . . . especially in color photography, where higher intensities of light are necessary.

### **Color Quality**

The light of this new lamp matches very closely the sensitivity of the new pan films, which means a more pleasing rendering of texture and tone. It brings out blacks or blues especially well and does not over-emphasize reds.

Its greater intensity seems to give the new MAZDA Movieflood lamp greater carrying power, which makes shadows softer and more natural, while highlights still retain desirable softness and definition. The new G. E. MAZDA Movieflood lamp is ideal for photographing large groups, large interiors and for color photography. It is a solution to the problem of those big jobs which have heretofore required a large number of big equipments with a much higher total wattage.

### **For Color Photography**

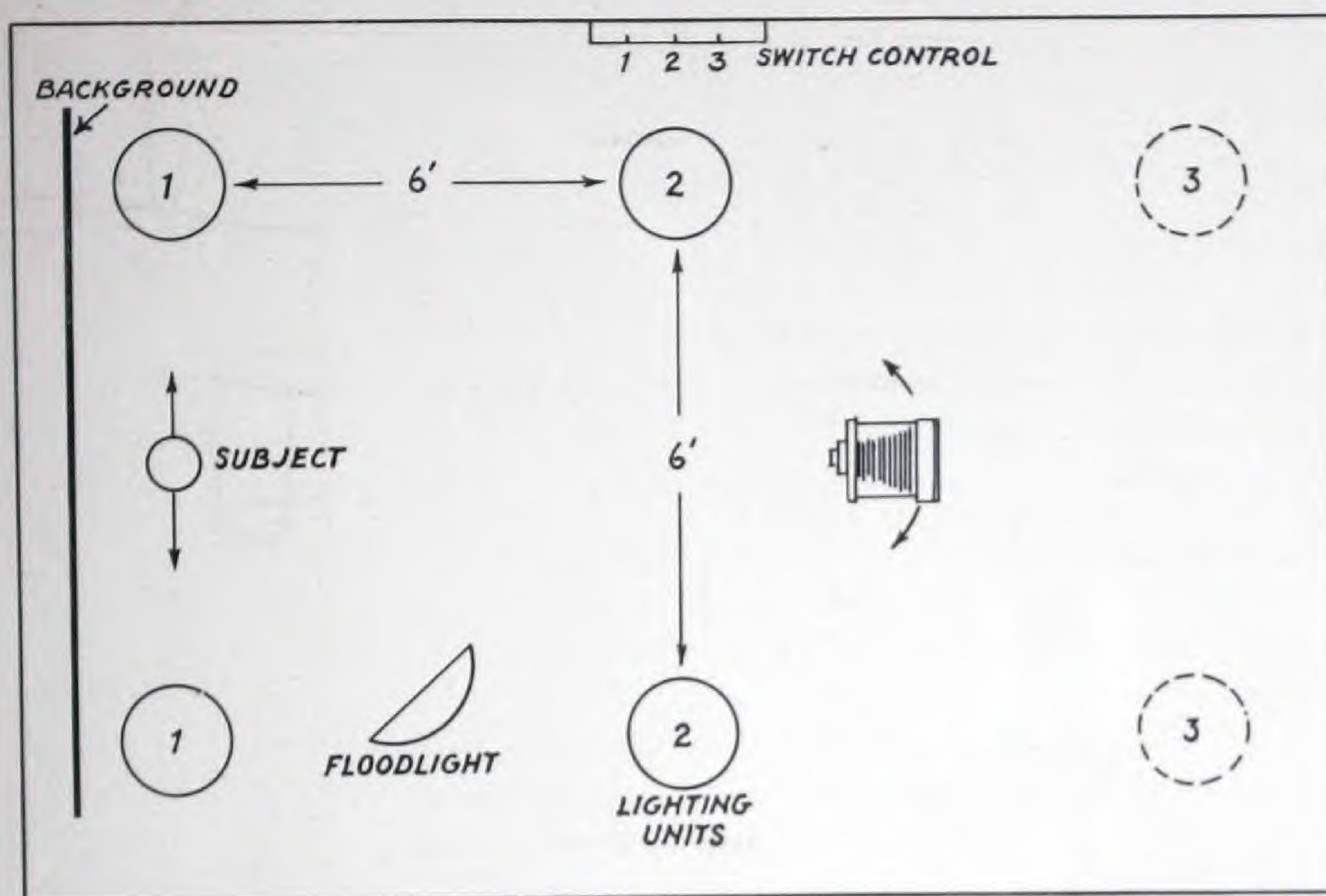
Lamps of the movieflood and photoflood type, when employed with Corning's Lunar White No. 570 glass filter, produce a practically perfect white light applicable to a number of color photographic processes. Note Fig. 3, page fifteen.





# Suggested Plan of Lighting the Small Studio

*Method which combines flexibility of lighting with low operating and installation cost*



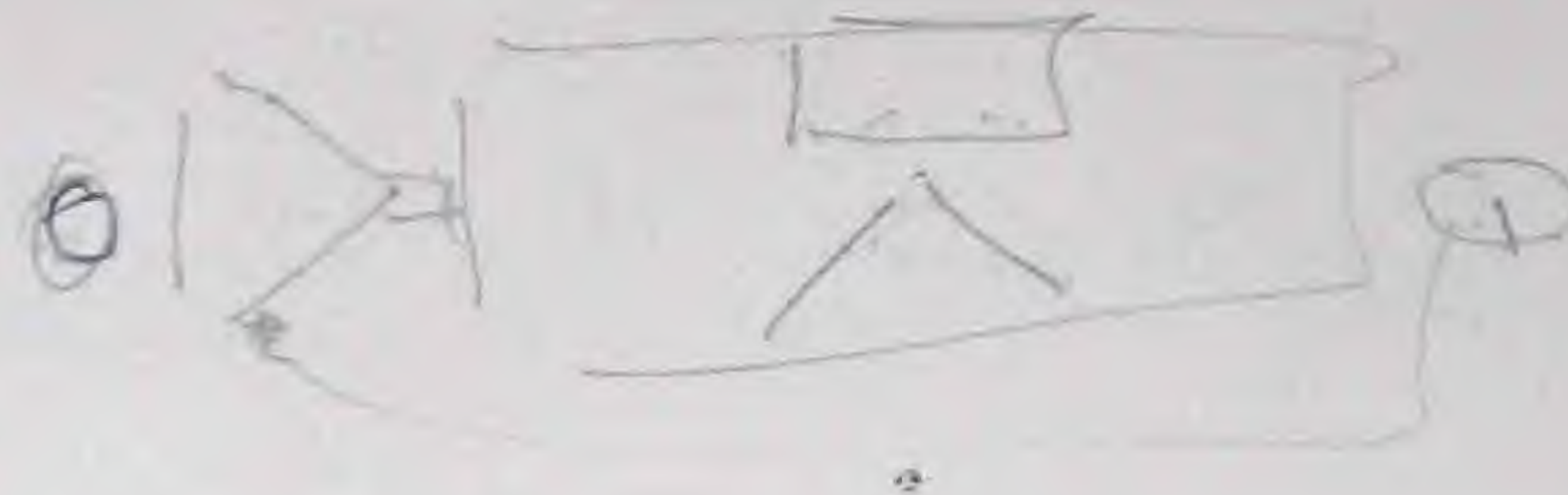
**A** FLEXIBLE arrangement of studio lighting may be attained at reasonable expense by following the above diagram which has been worked out and has proved itself efficient.

Adequate general lighting of diffused nature is desirable to simulate skylight conditions, illuminate shadows and shorten exposures. A practical system is to suspend four lighting units from the ceiling at the corners of a six foot square. These units should be of the indirect type, reflecting their light from a white ceiling, or the semi-indirect type. Photographic lamps of 500 or 1000 watt size may be used, or, where the shorter life is satisfactory for the higher intensity secured, the G. E. MAZDA Photoflood No. 4 may be employed.

Each of the like-numbered units should be wired together and to separate switches on the side-wall. Where photoflood lamps are used, they may be wired for series-parallel operation, or with a resistance in series for focusing. The use of additional units (as No. 3's) is exceedingly handy for general lighting sources.

A modelling light with a G. E. MAZDA Photoflood No. 4 is essential, of course, and may be supplemented by floodlights and spotlights employing Photoflood No. 1 for high-lighting and backlighting.





## ADDITIONAL G. E. MAZDA

**T**HE following data are based on careful laboratory tests of General Electric MAZDA lamps which are manufactured to meet high standards and rigid specifications, thereby assuring uniform, known performance.

### PHOTOFLASH LAMPS

#### Light Output

Owing to the fact that the photoflash lamp gives a relatively instantaneous flash of light of from 1/50th to 1/25th of a second's duration, the output is referred to in terms of "lumen seconds," thus:

No. 10—22,500 lumen seconds. No. 20—45,000 lumen seconds. No. 75—180,000 lumen seconds.

#### Amperage and Voltage Requirement for Flashing

Each lamp requires a minimum of 3 volts for firing, consuming from 1 to 1½ amperes. When higher voltages are employed, the flash starts somewhat earlier. In series operations all lamps flash together, but in parallel operations they may flash irregularly.

#### Flashing by Contact

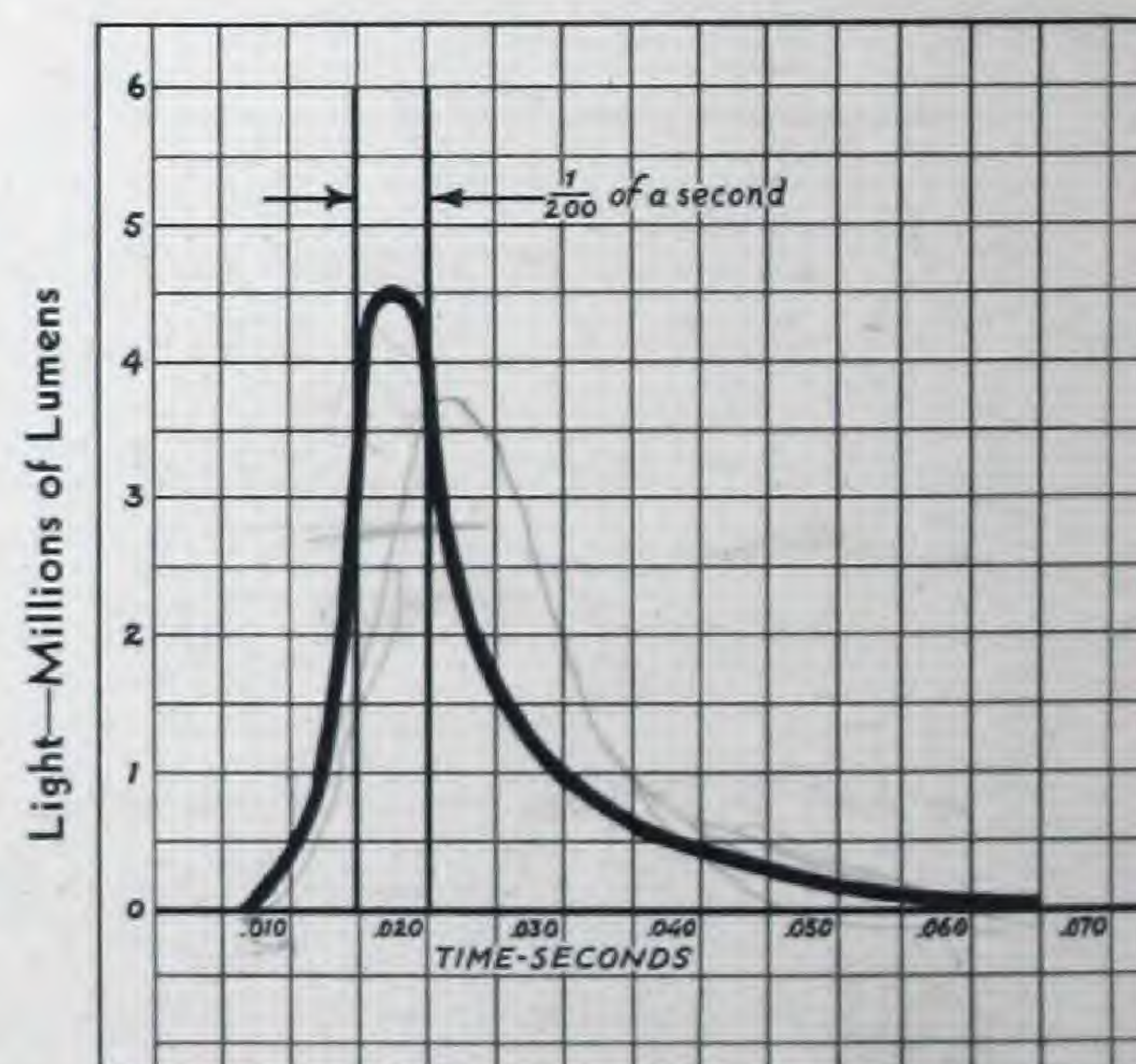
If one or more Photoflash lamps are placed within one-half an inch of a flashing lamp, they, too, will be flashed as a result of the enormous amount of energy emitted. There will be a time lag of approximately .013 seconds from the peak of the flash of the first lamp to the peak of the flash of the lamp being flashed by contact. However, while the scheme of using additional lamps flashed by contact to gain more light, is often useful in an emergency, the increase in illumination is by no means proportionate to the number of lamps used because of the screening effect of the lamps, and the effect on distribution of light from the reflector.

#### Synchronization at High Shutter Speeds

Oftentimes, particularly in newspaper work, the 1/50 second flash duration is not sufficient to stop rapid action and it is necessary to operate the shutter at 1/100 or 1/200 seconds. Since approximately .018 seconds elapse from the closing of the circuit to the peak of the flash, some delay device (popularly known as a synchronizer) is necessary to retard the operation of the shutter until the light reaches its maximum intensity. It is obvious in referring to Figure 1 that this requires a lamp of extremely close time characteristics. These are fully met by the No. 20 lamp. Since the No. 10 and No. 75 Photoflash are intended for those applications not requiring high speed shutter operation they are in general not recommended for use with synchronizers.

#### Room Lights

Room lights serve to assist in arranging the subject and camera and to soften the effect of the flash. Care must be taken, however, not to have subject sitting immediately under a bright light or have room lights shining directly into the lens.



Time—Light Characteristics of No. 20 MAZDA Photoflash Lamp

Figure 1



# DATA ON PHOTO LAMPS

## PHOTOFLOOD LAMPS

### Light Output

Light output of photoflood lamps is measured in lumens which indicates the light given off in all directions. Lumen output of photoflood lamps at various voltages:

	105 Volts	110 Volts	115 Volts	120 Volts
Photoflood No. 1	6,100	7,100	8,250	9,550
Photoflood No. 4	24,400	28,400	33,000	38,600
Movieflood	48,800	56,800	66,000	77,200

### Amperage Ratings

The amperage ratings of photoflood lamps are such that five of the No. 1 size may be safely used on the ordinary house circuit.

	105 Volts	110 Volts	115 Volts	120 Volts
Photoflood No. 1	1.95	2.08	2.13	2.18
Photoflood No. 4	7.95	8.32	8.70	8.90
Movieflood	15.90	16.64	17.40	17.80

### Candlepower Ratings

The following table shows the light output of Photoflood lamps in terms of mean spherical candlepower, or, the average candlepower in all directions for the bare lamp alone.

	105 Volts	110 Volts	115 Volts	120 Volts
Photoflood No. 1	485	565	656	756
Photoflood No. 4	1940	2260	2624	3024
Movieflood	3880	4520	5248	6048

### Conservation of Life

Its high efficiency secured at some sacrifice in length of life, the photoflood may be operated in series-parallel for reducing voltage while focusing. See Figure 2. Another method is to provide a resistance in series with the lamp or an adjustable voltage transformer to reduce the voltage at the lamp while focusing.

### Color Characteristics

The color characteristics of the light of an incandescent lamp are determined by the temperature at which the filament operates. The higher the temperature, the greater is the improvement of actinic and amount of light emitted. This is brought out clearly in Figure 3. The increased temperature, of course, carries with it a shorter lamp life. G. E. MAZDA Photoflood lamps represent the best balance between a right volume of photographically effective light and lamp renewal cost.

### Other Voltage and Enlarger Lamps

Special lamps for operation on 32-volt and 230-volt circuits are available as is a Photoflood lamp adapted for enlarger purposes (monogram moved to neck and a white diffusing coat added). These are obtainable through your photo supply dealer or the nearest General Electric Incandescent Lamp Sales Headquarters.

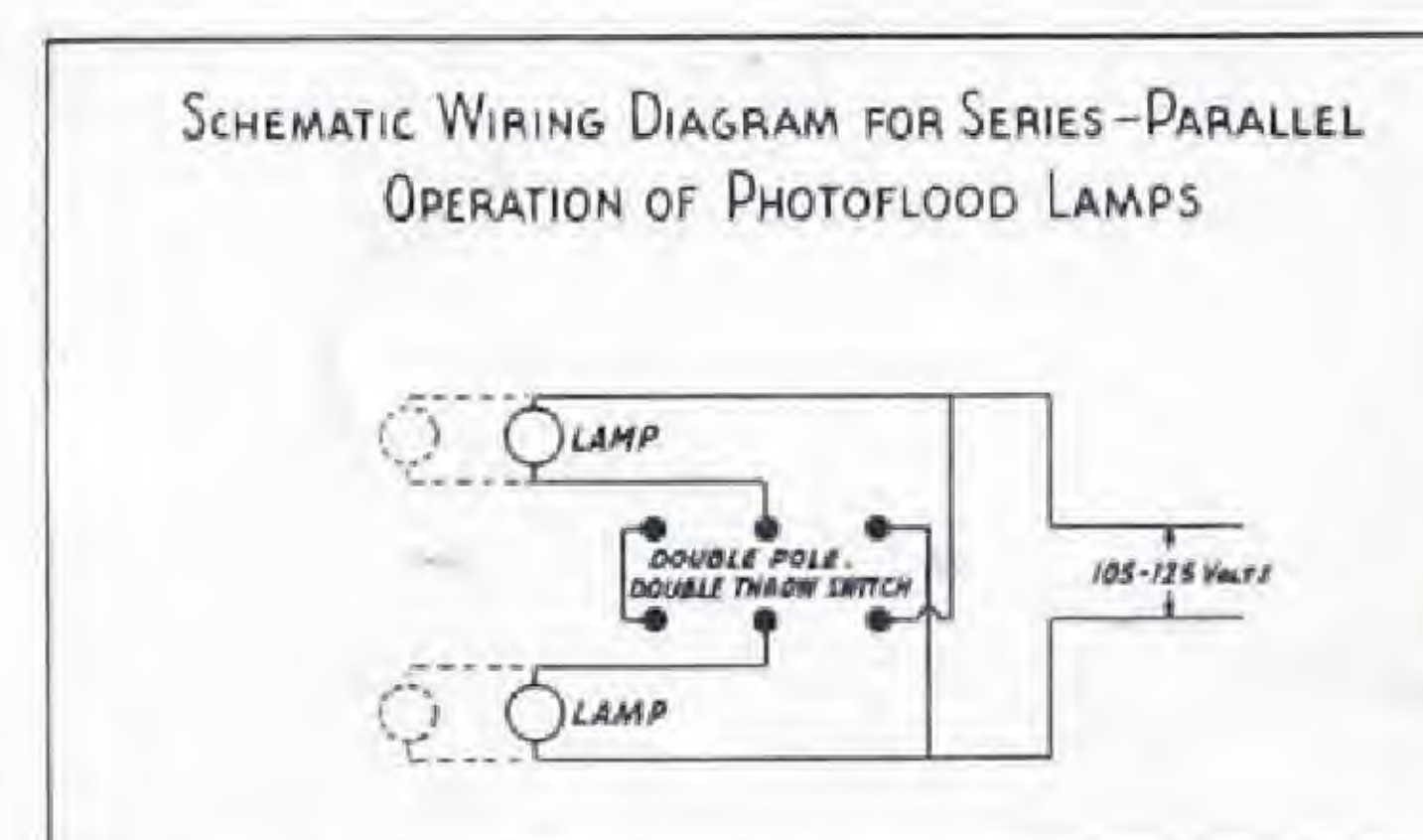


Figure 2

### Spectral Energy Distribution of MAZDA Lamps

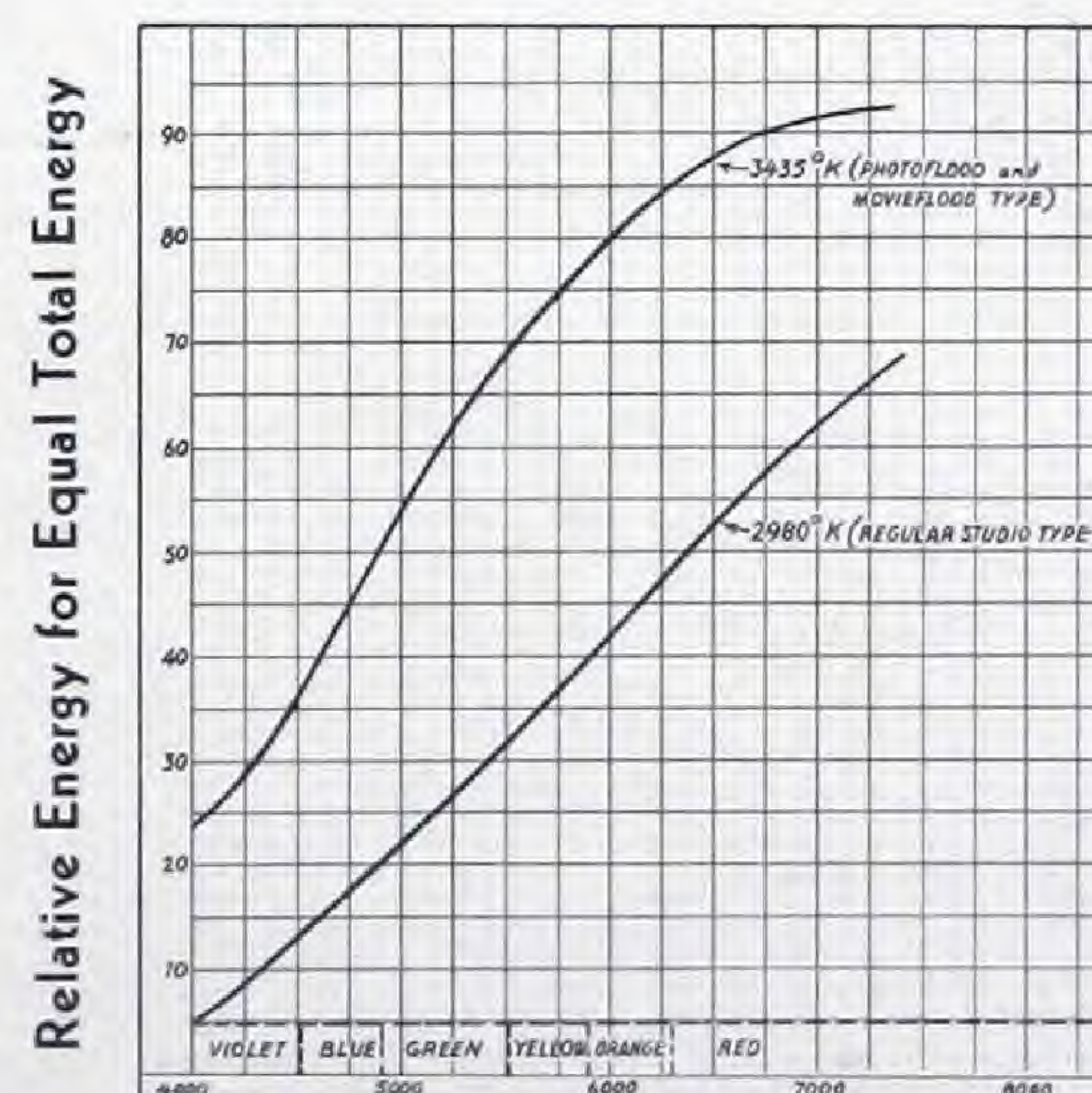


Figure 3



# G. E. MAZDA LAMPS

*Provided Superior Lighting for These Subjects*



*Photo by Lavecchia Studios*

*Gene Raymond, Fox Star  
Photo by Max Munn Autrey, Hollywood  
Courtesy Beattie, Hollywood*



*Photo by Beattie of Hollywood*



*Photo by Kreider, New York*



*Photo by Tesreau*



# FOR CONTROLLED LIGHTING

## Use

### G. E. MAZDA PHOTOGRAPHIC LAMPS

#### For General Lighting—In or Out of Studio

	Volts	Bulb	Type	Base
†Photoflash No. 10	3 to 125	A-19	....	Medium Screw
†Photoflash No. 20	3 to 125	A-23	....	Medium Screw
†Photoflash No. 75	3 to 125	PS-35	....	Medium Screw
†Photoflood No. 1	105 to 120	A-21	Inside Frosted	Medium Screw
†Photoflood No. 4	105 to 120	PS-35	Inside Frosted	Mogul Screw
Movieflood	105 to 120	PS-52	Clear	Mogul Screw

#### For General Lighting in Studio

Watts	Volts	Bulb	Type	Base
500	110, 115, 120	PS-40	Clear	Mogul Screw
500	110, 115, 120	PS-40	Photo Blue	
			Inside Frosted	Mogul Screw
1000	110, 115, 120	PS-52	Clear	Mogul Screw
1000	110, 115, 120	PS-52	Photo Blue	
			Inside Frosted	Mogul Screw
1500	110, 115, 120	PS-52	Clear	Mogul Screw
1500	110, 115, 120	PS-52	Photo Blue	
			Inside Frosted	Mogul Screw

#### For Spotlights

400	110, 115, 120	G-30	Clear	Medium Screw or Prefocus
400	110, 115, 120	G-30	Photo Blue	Medium Screw

#### For Home Portrait Equipments

500	110, 115, 120	T-20	Clear	Medium Screw or Prefocus
*500	110, 115, 120	T-20	Photo Blue	
			Inside Frosted	Medium Screw or Prefocus

#### Enlarger Lamps

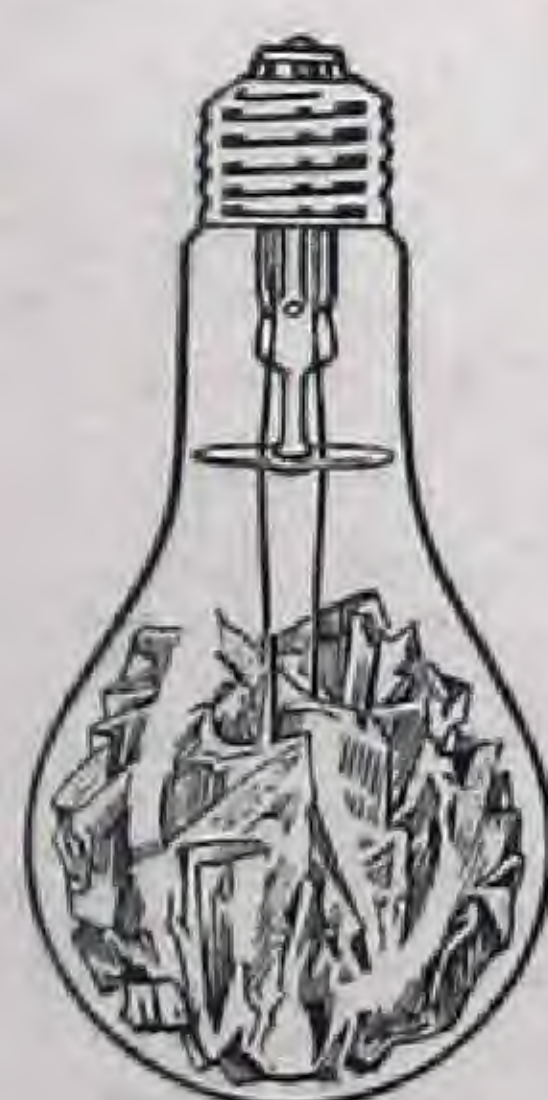
250	105 to 120	A-21	—**	Medium
250	110, 115, 120	PS-30	Clear	Medium
400	110, 115, 120	PS-35	Clear or Frosted Spot	Med. Skt.
1000	110, 115, 120	PS-52	Clear	Mogul

(Manufacturer's monogram, trade mark and rating etching on neck of bulb of these enlarger lamps.)

†Available on Photo Lamp Contracts.

\*Also available in 400-watt size if necessary for certain equipments.

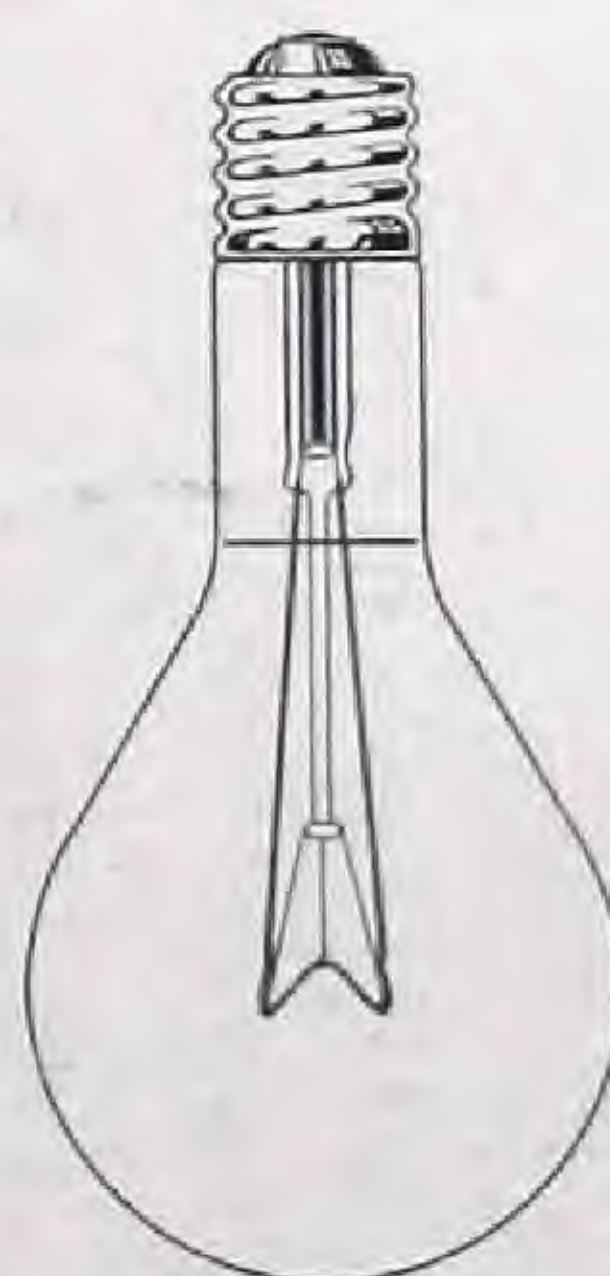
\*\*Inside frosted and outside coated white—2 hours life.



Photoflash



G—Globular



PS—Pear Shaped



T—Tubular



Photoflood



● For further information, communicate with the nearest office of the General Electric Company, Incandescent Lamp Division, as listed below, or with your photo supply dealer.

—||—

**ATLANTA**

*Red Rock Bldg.  
187 Spring St. N. W.*

**BOSTON**

*United Shoe Machinery Bldg.  
50 High Street*

**BUFFALO**

*Genesee Bldg.  
1 West Genesee St.*

**CHICAGO**

*Continental Ill. Bank Bldg.  
230 So. Clark St.*

**CLEVELAND**

*Terminal Tower  
Public Square*

**DALLAS**

*General Electric Bldg.  
1801 North Lamar St.*

**DENVER**

*Security Bldg.  
650 Seventeenth St.*

**DETROIT**

*Book Tower  
1249 Washington Blvd.*

**PHILADELPHIA**

*Mitten Bldg.  
1405 Locust St.*

**PITTSBURGH**

*Koppers Bldg.  
436 Seventh Ave.*

**NEW YORK**

*General Electric Bldg.  
570 Lexington Ave.*

**KANSAS CITY**

*Power & Light Bldg.  
106 West 14th St.*

**LOS ANGELES**

*Edison Bldg.  
601 West Fifth St.*

**MINNEAPOLIS**

*Thorpe Brothers Bldg  
523 Marquette Ave.*

**PORTLAND**

*Terminal Sales Bldg.  
1220 S. W. Morrison St.*

**SAN FRANCISCO**

*Russ Bldg.  
235 Montgomery St.*

**ST. LOUIS**

*Landreth Bldg.  
320 No. Fourth St.*

**GENERAL ELECTRIC COMPANY**  
Nela Park, Cleveland, Ohio

